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Bioluminescence In Situ Bathyphotometer

Chelsea Instruments Ltd. has begun the commercial production of a bioluminescence sensor which has been designed to work in conjunction with the "Aquashuttle" a towed undulating data acquisition vehicle. The initial development of this instrument was done at the Institute of Marine Environmental Research, now the Plymouth Marine Laboratory. Chelsea Instruments Ltd. re-engineered the sensor and is now manufacturing it under license. The bioluminescence sensor could be used on other platforms.

The principle of operation is based on the mechanical stimulation of bioluminescent organisms and the subsequent photometric detection of the emitted light. Mechanical stimulation is provided by the impeller of the flowmeter measuring the flow to the detector. Because of the wide range of existing bioluminescent phenomena (from single cell flashes to large-scale manifestations up to 10^8 cells/m³) a range of complementary measurements are made. The sensor embodies an event counter recording individual flashes at low frequency (0.1 to 20 Hz), and integrated intensity and peak measurements where individual flashes merge into a continuous signal.

The sensor can be used to measure bioluminescence day or night. The sensor is compact 120mm x 150mm, constructed of hard anodized aluminum and plastic, weighing 2.5 kgs. The power

consumption is said to be low (no details provided), and can be operated to 100-m depth. Flow rate through the sensor is 1 liter/sec. The sensor will count between 1 and 20 events/sec and will indicate a range of from 5×10^8 photons/sec to a full scale of 10^{12} photons.

This instrument is produced by the Marine and Environmental Division of Chelsea Instruments Ltd., East Molesey, Surrey, United Kingdom.

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